

**CLAIMS**

WE CLAIM:

1. In a system having multiple security channels, a method of  
5 modifying an entry in a security association database, the method associated with each channel comprising:  
determining whether another of the multiple security channels has a higher  
priority to access a security association database structure located at a  
predetermined address location in the security association database;  
10 retrieving the security association data structure from the predetermined address location when no other security channel has a higher priority to do so;  
modifying the retrieved security association data structure; and  
writing the modified security association data structure to the  
predetermined address location in the security association database.  
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2. The method of Claim 1, wherein the step of determining whether  
another of the multiple security channels has a higher priority to retrieve the  
security association data structure comprises:  
requesting access to the predetermined address location;  
20 assigning a weight value to the request based on a sequential order of the request relative to access requests made by other of the security channels; and  
granting the access request to the security channel with the highest  
assigned weight value.
3. The method of Claim 2, wherein the step of requesting access  
25 comprises setting a request bit in a control register.
4. The method of Claim 3, wherein the step of granting the access  
request comprises setting a grant bit in the control register.

5. The method of Claim 1, wherein the step of writing the modified security association data structure to the predetermined address location comprises:

writing the modified security association data structure to a write buffer prior to writing it to the predetermined address location; and

5 writing the modified security association data structure to the predetermined address location from the write the buffer.

6. The method of Claim 5, wherein the step of requesting access comprises setting a request bit in a control register, and wherein the method further comprises:

10 resetting the request bit prior to writing the modified security association data structure to the predetermined address location from the write buffer.

7. The method of Claim 5, further comprising:  
15 determining whether the write buffer is busy prior to writing the modified security association data structure thereto.

8. The method of Claim 1, further comprising:  
20 storing the retrieved security association data structure in a local memory;  
and  
modifying the retrieved security association data structure in the local memory.

9. The method of Claim 1, further comprising:  
25 storing the predetermined address location of the retrieved security association data structure in a register.

10. In a system having multiple security channels, a method of modifying an entry in a security association database, the method associated with each channel comprising:

requesting access to a predetermined address location in the security association database;

assigning a weight value to the request based on a sequential order of the request relative to access requests to the predetermined address location made by other of the security channels;

retrieving the security association data structure from the predetermined address location when the channel has a higher priority request relative to the other security channel requests;

modifying the retrieved security association data structure; and

writing the modified security association data structure to the predetermined address location in the security association database.

11. The method of Claim 10, wherein the step of requesting access comprises setting a request bit in a control register.

12. The method of Claim 10, wherein the security association data structure is retrieved in response to setting a grant bit in the control register.

13. The method of Claim 10, wherein the step of writing the modified security association data structure to the predetermined address location comprises:

writing the modified security association data structure of to a write buffer prior to writing it to the predetermined address location; and

writing the modified security association data structure to the predetermined address from the write buffer.

14. The method of Claim 13, wherein the step of requesting access comprises setting a request bit in a control register, and wherein the method further comprises:

resetting the request bit prior to writing the modified security association data structure to the predetermined address location from the write buffer.

15. The method of Claim 13, further comprising:  
determining whether the write buffer is busy prior to writing the modified  
5 security association data structure thereto.

16. The method of Claim 10, further comprising:  
storing the retrieved security association data structure in a local memory;  
and  
10 modifying the retrieved security association data structure .

17. The method of Claim 10, further comprising:  
storing the predetermined address location of the retrieved security  
association data structure in a register.  
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18. In a system having multiple security channels, a method of  
modifying an entry in a security association database, the method associated with  
each channel comprising:

requesting access to a predetermined address location in the security  
20 association database;

assigning a weight value to the request based on a sequential order of the  
request relative to access requests to the predetermined address location made by  
other of the security channels;

25 retrieving the security association data structure from the predetermined  
address location when the channel has a higher priority request relative to the  
other security channel requests;

modifying the retrieved security association data structure;

determining whether a write buffer is busy;

30 writing the modified security association data structure to the write buffer  
when it is not busy; and

writing the modified security association data structure to the predetermined address location in the security association database from the write buffer.

5           19. In a system having multiple security channels, a controller for managing access to an entry in a security association database, the controller comprising:

10               a register circuit including a plurality of first registers each individually communicating with one of the multiple security channels and each operable to receive a request, from its associated security channel, to retrieve a security association data structure located at a predetermined address in the security association database; and

15               an arbiter circuit communicating with the register circuit and operable (i) to prioritize, from highest to lowest priority, the retrieval requests received by each of the first registers and (ii) to grant the retrieval request to the security channel having the highest priority.

20           20. The controller of Claim 19, wherein the register circuit further comprises:

25               a plurality of second registers each individually communicating with one of the multiple security channels and each operable to receive, from its associated security channel, the predetermined address of the security association data structure for which retrieval access is requested by its associated security channel.

30           21. The controller of Claim 19, wherein the register circuit further comprises:

              a plurality of third registers each individually communicating with one of the multiple security channels and each operable to receive, from its associated security channel, an updated security association data structure.

22. The controller of Claim 19, further comprising:

a plurality of write buffer circuits each individually communicating with one of the multiple security channels and each operable to (i) receive a modified security association data structure from its associated security channel and (ii) write the modified security association data structure to the address location of the retrieved security association data structure, in response to the arbiter circuit subsequently granting a retrieval request to another of the multiple security channels.

23. The controller of Claim 22, wherein each of the write buffer circuits comprises a FIFO register.

24. The controller of Claim 22, further comprising:

a plurality of write buffer controller circuits each individually communicating with the register circuit and with one of the write buffer circuits and each operable to (i) determine whether its associated write buffer is available to receive the modified security association data structure and (ii) allow its associated write buffer to receive the modified security association data structure only when the write buffer is available.

25. The controller of Claim 24, wherein the register circuit further comprises:

a plurality of fourth registers each individually communicating with one of the write buffers and one of the write buffer controllers,

wherein each of the fourth registers operable to receive a busy/not-busy status bit of the write buffer controller and wherein the determination of whether each of the write buffer controller circuits associated write buffer is available is based on the busy/not-busy status bit.

26. The controller of Claim 19, wherein the arbiter circuit comprises:

a weight control logic circuit operable to assign a weight value to each of the retrieval requests received by each of the first registers;

a grant tree logic circuit coupled to the weight control logic circuit and operable to (i) determine which of the first registers has a highest weight value and (ii) generate a grant signal for the first register with the highest weight value; and

a grant logic circuit coupled to receive the grant signal from the grant tree logic circuit and, in response thereto, set a grant bit in the first register having the highest weight value.

27. In a system having multiple security channels, a controller for managing access to an entry in a security association database, the controller comprising:

a register circuit including a plurality of first registers each individually communicating with one of the multiple security channels and each operable to receive a request, from its associated security channel, to retrieve a security association data structure located at a predetermined address in the security association database;

an arbiter circuit communicating with the register circuit and operable (i) to prioritize, from highest to lowest priority, the retrieval requests received by each of the first registers and (ii) to grant the retrieval request to the security channel having the highest priority; and

a plurality of write buffer circuits each individually communicating with one of the multiple security channels and each operable to (i) receive an updated security association data structure from its associated security channel and (ii) write the modified security association data structure to the address location of the retrieved security association data structure, in response to the arbiter circuit subsequently granting a retrieval request to another of the multiple security channels.

28. The controller of Claim 27, wherein the register circuit further comprises:

5 a plurality of second registers each individually communicating with one of the multiple security channels and each operable to receive, from its associated security channel, the predetermined address of the security association data structure for which retrieval access is requested by its associated security channel.

29. The controller of Claim 27, wherein the register circuit further comprises:

10 a plurality of third registers each individually communicating with one of the multiple security channels and each operable to receive, from its associated security channel, an updated security association data structure.

30. The controller of Claim 27, further comprising:

15 a plurality of write buffer controller circuits each individually communicating with the register circuit and with one of the write buffer circuits and each operable to (i) determine whether its associated write buffer is available to receive the modified security association data structure and (ii) allow its associated write buffer to receive the modified security association data structure only when the write buffer is available.

31. The controller of Claim 30, wherein the register circuit further comprises:

25 a plurality of fourth registers each individually communicating with one of the write buffers and one of the write buffer controllers,

wherein each of the fourth registers operable to receive a busy/not-busy status bit of the write buffer controller and wherein the determination of whether each of the write buffer controller circuits associated write buffer is available is based on the busy/not-busy status bit.

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32. The controller of Claim 27, wherein the arbiter circuit comprises:

a weight control logic circuit operable to assign a weight value to each of the retrieval requests received by each of the first registers;

5 a grant tree logic circuit coupled to the weight control logic circuit and operable to (i) determine which of the first registers has a highest weight value and (ii) generate a grant signal for the first register with the highest weight value; and

10 a grant logic circuit coupled to receive the grant signal from the grant tree logic circuit and, in response thereto, set a grant bit in the first register having the highest weight value.

33. In a system having multiple security channels, a controller for managing access to an entry in a security association database, the controller comprising:

15 a register circuit including a plurality of first registers each individually communicating with one of the multiple security channels and each operable to receive a request, from its associated security channel, to retrieve a security association data structure located at a predetermined address in the security association database;

20 an arbiter circuit communicating with the register circuit and operable (i) to prioritize, from highest to lowest priority, the retrieval requests received by each of the first registers and (ii) to grant the retrieval request to the security channel having the highest priority, the arbiter circuit comprising:

25 a weight control logic circuit operable to assign a weight value to each of the retrieval requests received by each of the first registers;

a grant tree logic circuit coupled to the weight control logic circuit and operable to (i) determine which of the first registers has a highest weight value and (ii) generate a grant signal for the first register with the highest weight value; and

a grant logic circuit coupled to receive the grant signal from the grant tree logic circuit and, in response thereto, set a grant bit in the first register having the highest weight value;

and

5 a plurality of write buffer circuits each individually communicating with one of the multiple security channels and each operable to (i) receive an updated security association data structure from its associated security channel and (ii) write the modified security association data structure to the address location of the retrieved security association data structure, in response to the arbiter circuit  
10 subsequently granting a retrieval request to another of the multiple security channels.

34. In a system having multiple security channels, a controller for managing access to an entry in a security association database, the controller  
15 comprising:

a weight control logic circuit operable to assign a weight value to retrieval requests received by the controller from the multiple security channels;

a grant tree logic circuit coupled to the weight control logic circuit and operable to (i) determine which of the retrieval requests has a highest weight value  
20 and (ii) generate a grant signal for the retrieval request with the highest weight value; and

a grant logic circuit coupled to receive the grant signal from the grant tree logic circuit and, in response thereto, grant the retrieval request to the security channel having the highest weight value.

25 35. A computer-readable medium containing computer executable code for instructing one or more security channels in a computer system having multiple security channels to modify an entry in a security association database, the instructions comprising:

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determining whether another of the multiple security channels has a higher priority to access a security association database structure located at a predetermined address location in the security association database;

- 5       retrieving the security association data structure from the predetermined address location when no other security channel has a higher priority to do so;       modifying the retrieved security association data structure; and       writing the modified security association data structure to the predetermined address location in the security association database.

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